REBUTTAL TESTIMONY OF MARK E. MEITZEN

Q. Please state your name and business address.

A. My name is Mark E. Meitzen. I am a Vice President of Christensen Associates. My business address is 4610 University Avenue, Madison, WI 53705.

Q. Have you previously submitted testimony in this proceeding?

A. Yes, I have.

Q. What is the purpose of your rebuttal testimony?

A. First, I discuss the use of the chain-weighted GDPPI as the appropriate measure of economy-wide output inflation. I then respond to the testimony of Dr. Staranczak and the testimony of Dr. Selwyn. In particular, I will address Dr. Staranczak's and Dr. Selwyn's concerns regarding the cost of capital included in the TFPRP model I introduced in my supplemental testimony. I also address Dr. Selwyn's claim regarding the appropriate measurement of output in computing telecommunications industry TFP and other issues he raised regarding the TFPRP. I then address Dr. Selwyn's assertion that the X factor for Ameritech Illinois should be set at 6.5 percent, based on evidence introduced in the Federal Communications Commission's (FCC's) price cap proceedings.

I conclude that the evidence I introduced from the TFPRP model provides the Commission with the best, most recent information on telecommunications industry productivity.

1. GDPPI

Q. Has anyone expressed disagreement with your conclusion that the chain-weighted GDPPI is the appropriate measure of economy-wide output inflation?

A. No. There is agreement that the chain-weighted GDPPI is the appropriate measure to use.

2. The Ameritech Illinois and TFPRP Analyses

Q. Subsequent to the filing of your testimony, the bureau of labor statistics updated its U.S. multifactor productivity numbers. Dr. Selwyn criticizes you for failing to include the updated data. Have you considered this update?

A. Yes, I have. At the time I prepared my supplemental testimony, I noted that the BLS had last released data on economy-wide productivity in February of 1999 and the data in that release extended through 1997. I also noted that the historical record would be updated and revised in late 2000 and that it is important to determine what the revised and updated economy-wide productivity gains would likely be. Therefore, in my supplemental testimony, I estimated 1998 and 1999 economy-wide productivity growth realizing that the BLS would soon issue updated and revised information, and that these data would be substituted for my estimates. Now that the BLS has released new information and, now that it is available, I have used it to revise my estimates of the TFP and input price differentials.

Q. What are the results of using the updated BLS data?

A. The BLS has updated its figures through 1998, and I have incorporated this new information into my analysis. The results of incorporating the BLS update are presented in Table 1. Table 1 includes TFP and input price differentials between the LEC industry and the U.S. economy. Because the Commission's Order that approved the Ameritech Illinois alternative regulation plan also called for a review of Ameritech Illinois productivity gains,[1] I have also included differentials between Ameritech Illinois and the U.S economy in Table 1.

Using the most recent BLS figures, over the 1992 to 1998 period, U.S. economy productivity growth was 1.0 percent, (compared to 1.1 percent I computed in my supplemental testimony), and economy-wide input price growth was 3.0 percent (compared to 3.1 percent I computed in my supplemental testimony). Using the LEC industry TFP and input price growth figures from the TFPRP for the same period, 1992 to 1998, produces a TFP differential of 2.4 percent and an input price differential of 0.9 percent,[2] for an X factor of 3.3 percent (compared to 3.3 percent I computed in my supplemental testimony). The estimates of economy-wide productivity and input price growth I provided in my supplemental testimony were very close to the values based on the recently-released BLS data

[1] Illinois Commerce Commission, Dockets No. 92-0448/93-0239 Consol., October 11, 1994, p. 95.
[2] Using two decimal places, US input price growth was 2.98 percent and industry input price growth was 2.04 percent, for a 0.94 percent differential.

and the resulting X factor is the same as I reported in my supplemental testimony.

Table 1
Computation of TFP and Input Price Differentials
Using Updated BLS Information

	LEC Industry – US Differentials		
	Industry 1992-98	US 1992-98	Differential 1992-98
TFP	3.4%	1.0%	2.4%
Input Price	2.0%	3.0%	0.9%
X Factor			3.3%

	Ameritech – US Differential		
	Ameritech 1992-99	US 1992-99	Differential 1992-99
TFP	4.2%	1.1%	3.1%
Input Price	2.5%	3.0%	0.5%
X Factor			3.5%

Because the most recent figures released by the BLS only go through 1998, the estimation of economy-wide TFP for 1999 is required to produce the TFP and input price differentials for the Ameritech Illinois TFP study, which runs from 1992 through 1999. I have estimated 1999 economy-wide TFP using the same method I used in my supplemental testimony and described in Attachment 1 to that testimony.[3]

Over the 1992 to 1999 period, U.S. economy productivity growth was 1.1 percent, (compared to 1.2 percent I computed in my supplemental testimony), and economy-wide input price growth was 3.0 percent (compared to 3.1 percent I computed in my supplemental testimony). Using the Ameritech Illinois TFP and

[3] It is important to note that I have only produced this 1999 estimate to be used with the 1999Ameritech Illinois data. The estimation of 1999 economy-wide TFP is not necessary to produce the X factor based on LEC industry data.

input price growth figures for the same period produces a TFP differential of 3.1 percent and an input price differential of 0.5 percent, for an X factor of 3.5 percent (compared to 3.5 percent I computed in my supplemental testimony).[4] Again, the X factor using Ameritech Illinois data is the same using the updated BLS data as it was in my supplemental testimony.

Q. You have used the TFPRP model for your evidence on LEC industry TFP and input price growth. Is the TFPRP the appropriate basis for assessing LEC industry performance and setting the X factor for Ameritech Illinois?

A. Yes, it is. The TFPRP provides recent evidence for the LEC industry as it computes TFP and input price growth through 1998. The TFPRP is methodologically consistent with the Ameritech Illinois TFP study filed in 1992 by Dr. Christensen, and that the Commission relied on in establishing the X factor for Ameritech Illinois. It is also consistent with the updated Ameritech Illinois TFP study I have introduced in this proceeding.

Q. Have other parties in this proceeding commented on the TFPRP?

A. Yes. Dr. Staranczak and Dr. Selwyn have commented on the TFPRP model.

Q. What did Dr. Staranczak and Dr. Selwyn say about the TFPRP?

A. Both Dr. Staranczak and Dr. Selwyn expressed concern about the cost of capital used in the TFPRP. Other than the cost of capital, Dr. Staranczak has not expressed any other concerns about the TFPRP. Dr. Selwyn also asserts that the

[4] Using three decimal places, the TFP differential was 3.072 percent and the input price differential was 0.454 percent, for an X factor of 3.526.

TFPRP incorrectly uses deflated revenues to measure local output and he claims some other errors exist in the TFPRP. It should be noted that while Dr. Selwyn disagrees with my use of the TFPRP, he appears to be in agreement with the position that evidence on industry TFP and input price growth is the best basis for setting the X factor.

Q. What are their concerns about the cost of capital used in the TFPRP?

A. Dr. Staranczak and Dr. Selwyn have expressed concern that the TFPRP uses the cost of capital for the U.S. economy implicit in the U.S. National Income and Product Accounts. As such, it is not specific to the telecommunications industry. In addition, the U.S. economy cost of capital is not constructed explicitly as a weighted cost of capital, with separate debt and equity components.

Q. Why did the TFPRP use the U.S. economy cost of capital?

A. When the TFPRP was originally constructed, the FCC required that the data used to produce TFP estimates be based on accessible and verifiable data and not on proprietary data that was not publicly available.[5] In response to this FCC mandate, the TFPRP used the cost of capital for the U.S. economy implicit in the U.S. National Income and Product Accounts. All data used to compute the U.S. economy cost of capital are produced by the U.S. Bureau of Economic Analysis and are publicly available. At that time, my colleagues and I submitted an exhibit endorsing this approach. We stated that, because capital markets are national and

[5] Fourth Further Notice of Proposed Rulemaking, FCC 95-406, September 27, 1995, para 16-18.

because the riskiness of telephone assets and other assets in the U.S. economy are similar, year-to-year changes in the telephone industry cost of capital should follow year-to-year changes in the U.S. economy cost of capital, thus making the economy-wide cost of capital a suitable proxy for an industry-specific cost of capital.[6]

Q. Have you performed any analysis regarding the cost of capital in the TFPRP model?

A. Yes, I have. In response to Staff's data requests in this proceeding, alternative values for the cost of capital using separate debt and equity components were substituted in the TFPRP model.[7] These scenarios, which include Ameritech's cost of capital, presumably represent Staff's view of appropriate debt and equity costs for the telephone industry. Schedule 1 shows the TFP differential, input price differential, and X factor that resulted from the various cost of capital scenarios requested by Staff. It is apparent that making the cost of capital more specific to the telecommunications industry has a negligible effect on the results of the TFPRP and, if anything, generally produces a lower X factor than the one I computed in my supplemental testimony.

[6] Laurits R. Christensen, Philip E. Schoech, and Mark E. Meitzen, Total Factor Productivity Methods for Local Exchange Carrier Price Cap Plans, December 18, 1995.
[7] Staff Data Request GS-4.04. These are the data request responses that Dr. Staranczak indicated in his testimony that he was waiting for.

Q. Dr. Selwyn asserts that a cost of capital specific to non-competitive services should be used in the computation of TFP. Do you agree?

A. No, I do not. The cost of capital should relate to the entire range of services that are included in the computation of TFP, not just a subset of services. While there may be issues surrounding the use of the economy-wide cost of capital in the TFPRP, I have explained above why it was used and I have also performed the analysis requested by Staff using alternative values for the cost of capital. To the extent the alternative values represent Staff's view of an appropriate cost of capital for the telecommunications industry, I have demonstrated the effect of using these alternative and, presumably in the view of Staff, more appropriate values. Finally, among the alternatives requested by Staff was Ameritech's cost of capital.

Q. Dr. Selwyn states that the TFPRP model incorrectly uses deflated revenues to measure local output. He states that a proper TFP model would use a direct, physical measure of local output. Do you agree with his assessment?

A. No, I do not. The deflated revenue approach is a well-known and widely accepted method for measuring output. This approach is particularly appropriate for industries that provide a wide array of services, such as the telephone industry, where it is difficult to come up with adequate physical measures of output, because physical measures are not always available for all of the services in question. [8] By dividing revenue by an index that represents changes in prices over

[8] In fact, Dr. Selwyn has noted the difficulty of applying the physical measures approach in measuring telecommunications output and the widespread use of the deflated revenue approach. See Lee L. Selwyn

time, the resulting output index reflects the change in the quantity of the service(s) generating the revenue.

The wide acceptance of the deflated revenue approach to measuring output is illustrated by the fact that the BLS uses the deflated revenue approach to construct its output index for the telecommunications industry. The deflated revenue approach was also used in the original Ameritech Illinois TFP study relied on by the Commission to establish the X factor for Ameritech Illinois in its 1994 Order, and is being used in the updated Ameritech Illinois study that I introduced in this proceeding.

Q. Dr. Selwyn states that the total number of dial equipment minutes (DEM) or the number of calls would more accurately measure local output growth. Do you agree with his assessment?

A. No. Local service is made up of a variety of outputs, including access to the network, calls made, duration of calls, and vertical services. These various outputs grow at different rates and, therefore, an unbiased measure of local service growth would need to weight the growth in all of these outputs by the relative revenues generated by these outputs. As I stated above, the deflated revenue approach has been widely used under such circumstances because of the difficulty in constructing a comprehensive physical measure of output. Additionally, when used to determine the X factor for price cap regulation, it is important that the measure of output match the sources of output that generate

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and Francoise M. Clottes, "Measurement of Telecommunications Productivity: Methods, Applications and Limitations," February 1993, p. 4.

revenue. That is, the relevant measure of output relates to the rates being regulated by the price cap mechanism. By controlling for price changes of the appropriate rate categories, this is accomplished by the deflated revenue approach. Conversely, a deficient set of physical measures will not provide the appropriate measurement of output for the X factor.

Q. Why is it important for the specification of output to be consistent with the sources of revenue?

A. The correct specification of output is a critical component of accurate X factor calibration. In order for the X factor to provide the correct ceiling on prices, the definition of output that goes into the X factor must be consistent with the sources of revenue growth for the company. Otherwise the prices that the company is allowed to charge under the cap will be either too high or too low.

Q. Could you please explain?

A. To better understand the conceptual issues involved, I present a simplified example of the price cap problem in Table 2. In the example, the telephone company only provides local service, and all revenue is generated through a monthly connection charge. Thus, revenue growth is tied to access line growth. In the example, the firm is performing exactly at the efficiency benchmark set by the regulator; i.e. the firm is neither above nor below that benchmark. Under those circumstances, the objective of the regulator is to have prices exactly cover cost.

The first column of the table shows the calculation of the X factor and PCI growth when the output measure is the number of access lines (which determines the growth in revenue under our assumptions). The second column shows the calculation when the output measure is the number of DEM (assumed to grow faster than access lines). All numbers used in the table are for purposes of illustration, and should not be viewed as actual measures of the telephone industry or the economy.

Table 2
Example of X Factor Calculation
Using Number of Access Lines and DEM

	Basing Output on Lines	Basing Output on DEM
U.S. Economy:		
GDPPI growth	2.0%	2.0%
TFP Growth	1.0%	1.0%
Input Price Growth	3.0%	3.0%
Telecommunications:		
	(Access Lines)	(DEM)
Growth in Output	3.5%	4.5%
Growth in Input	1.0%	1.0%
Growth in TFP	2.5%	3.5%
Input Price Growth	2.0%	2.0%
Price Cap Calculation		
TFP Differential	1.5%	2.5%
Input Price Differential	1.0%	1.0%
X Factor	2.5%	3.5%
PCI Increase (GDPPI – X)	-0.5%	-1.5%
Revenue Increase (PCI Growth plus Access Line Growth)	3.0%	2.0%
Cost Increase (Input Price Growth plus Input Quantity Growth)	3.0%	3.0%
Difference Between Revenue Growth and Cost Growth	0.0%	-1.0%

As one can see in Table 2, setting the X factor based on the number of DEM does not allow price increases to cover cost increases, while basing the X factor on the number of access lines allows prices to increase at the correct rate. This is because revenue is generated by increases in the number of access lines, not the number of DEM.

The reason that the deflated revenue approach provides more reliable results than the physical output approach is that it adjusts actual revenues over time for the increase or decrease in revenue due to rate changes. The remaining revenue growth is due to changes in the volumes of those services that generate revenue. In my simple example, the deflated revenue approach would generate an output measure that corresponds to growth in the number of lines.

If it is assumed that revenue is generated both through a monthly connection charge and a per minute of use charge, the same conclusion holds that output measures must match the revenue sources in order to appropriately calibrate the X factor. For example, assume that 90 percent of revenue is generated through the monthly connection charge and 10 percent is generated through the minute of use charge. The appropriate measure of output in this case would be comprised of both access line growth and DEM growth, weighted by their respective revenue shares. Therefore, in this example, output growth would be 3.6 percent (= 0.9 * 3.5% + 0.1 * 4.5%). Again, if DEM growth was used alone as a measure of

output, output growth and the X factor would be too high and prices would not be allowed to grow at a rate sufficient to cover costs.

Q. Dr. Selwyn claims that government data used in the TFPRP have not been updated to reflect revisions and corrections to that data. How do you respond?

A. The TFPRP uses a number of price indexes constructed by the BLS and the U.S. Department of Commerce Bureau of Economic Analysis (BEA) in its computations. Because it was intended that the TFPRP be calculated annually as each year's data became available, the USTA made a decision to only use the most recent BLS and BEA information for the year that was being added to the study at that time. The USTA reasoned that this would simplify the annual updating of the model, since only the most recent year's data would need to be added. In addition, by using only the most recent year's data, the previous years' results of the model would not change from year to year due to data revisions. The simplicity of updating and stability of results were important goals because, at the time, the FCC was investigating the possibility of the X factor being updated annually using a rolling average of the most recent five years of data.[9]

Q. Have you determined the sensitivity of the TFPRP results to updates in the BLS and BEA information?

A. Yes, I have. I have replaced the original BLS and BEA indexes used in the TFPRP with their most recent revisions. This causes minimal change in the X factor, as it declines slightly to 3.1 percent, compared to 3.3 percent in Table 1.

[9] Fourth Further Notice of Proposed Rulemaking, paras 96-101.

As I discussed above, I have already updated the BLS information for economy-wide productivity and input price growth and Dr. Selwyn notes that these adjustments are appropriate.

Q. Dr. Selwyn asserts that it is important to use unseparated results to determine the X factor. Do you agree?

A. Yes, I do. The results I have reported for both the TFPRP and the Ameritech Illinois study are not separated by jurisdiction. By its nature, the calculation of TFP cannot be performed on subunits, such as interstate or intrastate operations, that are defined by accounting cost allocations and do not have economically separate inputs.

3. The FCC's Productivity Analysis

Q. Dr. Selwyn rejects the TFPRP model and states the X factor should be set at 6.5 percent, based on the FCC's TFP model. Do you agree?

A. No, I do not. The FCC's TFP model, introduced in the FCC's price cap proceeding,[10] is not adequate, nor is it appropriate for establishing the X factor. There are both data and methodological problems with the FCC's TFP model.

Q. What problems are caused by the data from the FCC's TFP model?

A. First, the 6.5% X factor produced from the FCC's analysis only contains data through 1995. This means that only one year out of five years of the Plan is incorporated. Thus, it does not represent recent evidence available on LEC

[10] Fourth Report and Order in CC Docket No. 94-1 and Second Report and Order in CC Docket No. 96-262 FCC 97-159, May 21, 1997.

industry TFP and input price growth and it does not respond to the Commission's request for such information in this review proceeding.

Q. Are there significant methodological problems with the FCC's model?

A. Yes. The FCC's model relies on a single, physical measure of local output. The original FCC model released in 1997 used the number of local calls as its measure of local output. In its 1999 Notice, the FCC solicited comments on whether dial equipment minutes should be used instead because of the increased growth in local minutes.[11] The result of substituting DEM for the number of local calls would be to upwardly bias measured output and TFP growth, thus increasing the measured X factor. In either case, each of these measures, by themselves, is an incomplete measure of local output which, as I described above, has a number of dimensions.

Q. Are there other problems with the FCC's model?

A. Yes. The FCC model used the "residual earnings" method to estimate the price of capital. The residual earnings approach estimated capital cost by subtracting labor and materials cost from revenue, and assumed that this residual was equal in value to capital cost. In general residual earnings will not equal capital cost. For residual earnings to equal capital cost, the earned rate of return would need to match the cost of debt and equity in every period. While regulatory authorities make some effort to keep earnings in line with the cost of capital, this does not

[11] Sixth Report and Order in CC Docket Nos 96-262 and 94-1, Report and Order in CC Docket No. 99-249, Eleventh Report and Order in CC Docket No. 96-45, FCC 00-193, May 31, 2000.

occur in each and every period, nor is it required under price cap regulation. For this reason it is more appropriate to directly compute capital cost, using the methods employed in the TFPRP and the Ameritech productivity study. In fact, by 1999 the FCC staff reversed its position and concluded that there was no reason to assume that capital cost equaled residual earnings.[12] The effect of using the residual earnings approach to estimate capital was to increase the measured input price differential, thus increasing the measured X factor.

In addition to using residual earnings, the FCC model used inappropriate physical measures for outputs other than local output (particularly interstate special access), and it treated miscellaneous services in an inconsistent manner. The effect of these problems was to increase measured output and TFP growth, thus increasing the X factor. The FCC model also contained numerous accounting errors that tended to have countervailing effects on measured TFP and input price, thus having little or no effect on the measured X factor.

Q. What is the status of the FCC TFP model?

A. The FCC's analysis and conclusions based on its model, were remanded back to the FCC by the U.S. Court of Appeals for D.C. Circuit for further explanation.[13] The FCC's model created a wide range of results over various time periods. The FCC determined its X factor by choosing from the high end of this range. The Court concluded that the FCC did not provide a rational explanation of their

[12] Further Notice of Proposed Rulemaking, CC Dockets 94-1 and 96-262, FCC 99-345, November 15, 1999. While the 1999 staff paper offered an alternative to the residual earnings approach, the alternative was inconsistent with economic theory and produced significant errors.
[13] USTA v FCC, Nos. 97-1469 et. al, (D.C. Cir, May 21, 1999)

choice of 6.0% as the historical component of the X factor (i.e., before the addition of a 0.5% consumer productivity dividend). In particular, the Court stated, "None of the reasons given for choosing 6.0% holds water" and "The Commission having failed to state a coherent theory supporting its choice of 6.0%, we remand for further explanation."

Q. Isn't it true, however, that the FCC currently uses an X factor of 6.5 percent in its price cap formula for the LECs?

A. Yes, but the FCC acknowledges that this is not a productivity-based number. The FCC initiated a further investigation into its measurement of TFP as a result of the Court remand.[14] In this investigation, they solicited comments on alternative methods for measuring TFP, as well as asking for any other suggestions commenters had. The FCC noted the Court's rejection of its productivity-based X factor:

> [T]he court reversed and remanded for further explanation the Commission's decision to select an X-factor of 6.5 percent … The court rejected the Commission's stated rationales for selection 6.0 percent as the historical component of the X-factor. In particular, the court rejected the Commission's reasons for placing less weight on the lowest averages of productivity growth used to establish the range of reasonableness of 5.2 to 6.3 percent. The court also found that the Commission failed to explain adequately its reliance on an apparent upward trend in productivity growth. (para 138)

However, before this proceeding was concluded and a TFP methodology was chosen, the FCC adopted a compromise that was reached among various

[14] Id.

interested parties, the CALLS Proposal.[15] The FCC was explicit that the X factor it adopted from the CALLS Proposal was no longer based on TFP, but rather was a transitional mechanism to achieve a reduction in selected rates:

> [T]he current X-factor of 6.5 percent, which was set in 1997, is currently on remand with the Commission. By adopting the reasonable approach set forth in the CALLS Proposal, which treats the X-factor not as a productivity estimate but as a method to reduce rates to certain levels, we expect to end the debate over the appropriate size of the X-factor now and for the next five years for participating price cap LECs. (para 40)
>
> The X-factor would serve a different function under the CALLS Proposal than in the original price cap plan. Instead of representing an estimate of expected annual productivity gains, the X-factor under the CALLS Proposal would be used to reduce local switching and switched transport rates to specified target rate levels and to reduce special access rates over a set period of time. The proposal thus transforms the X-factor from a productivity factor into a transitional mechanism that operates to reduce rates at a certain pace, and it would not be linked to a specific measure of productivity. (para 140)
>
> During the five-year term of the CALLS Proposal, the X-factor as adopted herein will not be a productivity factor as it has been in past price cap formulas. Instead, the X-factor is now a transitional mechanism to lower access charges to target rates for switched access, and to lower rates for a specified time period for special access. (para 160)

The transitional nature of the 6.5 percent X factor is highlighted by the FCC's plan to effectively freeze rates, once targeted rates are achieved, by setting the X factor at the rate of growth in the GDPPI:

> Once a price cap LEC reaches the applicable target rate level, the X-factor for all baskets except special access will equal GDPPI. (para 163)

[15] Sixth Report and Order

Q. Does the FCC's X factor provide evidence the Commission can rely on in reviewing the Ameritech Illinois Alternative Regulation Plan?

A. No, it does not. As I noted in my supplemental testimony, the Commission's Order, which approved the Ameritech Illinois alternative regulation plan, called for a review of the plan. Among the items to be reviewed was an assessment of the productivity gains that form the basis of the offset to inflation (i.e., "X factor") in Ameritech Illinois' price index formula. The Commission stated that the review should assess productivity gains for the economy as a whole, for the telecommunications industry (if data were available) and for Ameritech Illinois.[16] Because the FCC's 6.5% X factor is not based on productivity analysis, it fails to meet the Commission's requirement that calls for an assessment of productivity gains for the telecommunications industry. Therefore, the proposal for a 6.5 percent X factor should be rejected since it fails to meet the Commission's standards for review of the X factor in this proceeding.

Q. What do you conclude regarding the measurement of LEC industry TFP and input price?

A. The TFPRP results I introduced in my supplemental testimony provide the best evidence on which to base the X factor for Ameritech Illinois. It provides the most current industry results available. It is consistent with the methodology relied on by the Commission to establish the original X factor for Ameritech Illinois. Furthermore, the results are robust with respect to alterations in the cost of capital and the measurement of output is properly constructed.

Incorporating the latest BLS figures for economy-wide productivity leave the conclusions of my previous analysis unchanged. The combined TFP and input price differentials remain 3.3 percent using LEC industry results and 3.5 percent using Ameritech Illinois results. In addition, substituting Staff's alternative values for the cost of capital in the TFPRP generally results in lower X factors than those I originally reported.

Q. Does this conclude your testimony?

A. Yes, it does.

[16] Order; p. 95

Schedule 1

TFPRP Results Under Staff's Alternative Cost of Capital Assumptions

	Cost of Capital	Industry TFP	Industry Input Price	TFP Differential	Input Price Diff	X Factor
1992	10.92%					
1993	10.68%	3.6%	4.6%	3.1%	-1.7%	1.4%
1994	10.81%	2.4%	1.8%	1.2%	1.4%	2.6%
1995	11.33%	3.9%	2.6%	3.6%	-0.1%	3.5%
1996	11.30%	6.3%	1.5%	4.6%	2.2%	6.7%
1997	11.74%	1.0%	4.2%	0.0%	-1.3%	-1.3%
1998	12.00%	3.5%	1.9%	1.5%	1.3%	2.8%
Average		3.5%	2.8%	2.3%	0.3%	2.6%

	Cost of Capital	Industry TFP	Industry Input Price	TFP Differential	Input Price Diff	X Factor
1992	10.26%					
1993	9.97%	3.6%	4.5%	3.2%	-1.6%	1.5%
1994	9.94%	2.4%	1.4%	1.2%	1.8%	3.0%
1995	10.00%	4.0%	1.4%	3.7%	1.1%	4.7%
1996	9.69%	6.4%	0.8%	4.6%	2.9%	7.5%
1997	9.71%	1.0%	3.3%	0.0%	-0.4%	-0.3%
1998	9.76%	3.5%	1.6%	1.5%	1.6%	3.1%
Average		3.5%	2.2%	2.4%	0.9%	3.3%

	Cost of Capital	Industry TFP	Industry Input Price	TFP Differential	Input Price Diff	X Factor
1992	9.72%					
1993	9.72%	3.7%	5.3%	3.2%	-2.5%	0.7%
1994	9.72%	2.4%	1.5%	1.2%	1.7%	3.0%
1995	9.76%	4.0%	1.3%	3.7%	1.1%	4.8%
1996	9.80%	6.4%	1.8%	4.6%	1.9%	6.6%
1997	9.80%	1.0%	3.2%	0.0%	-0.3%	-0.3%
1998	9.63%	3.5%	1.0%	1.5%	2.2%	3.7%
Average		3.5%	2.4%	2.4%	0.7%	3.1%

	Cost of Capital	Industry TFP	Industry Input Price	TFP Differential	Input Price Diff	X Factor
1992	10.26%					
1993	9.97%	3.6%	4.5%	3.2%	-1.6%	1.5%
1994	9.94%	2.4%	1.4%	1.2%	1.8%	3.0%
1995	10.24%	4.0%	2.0%	3.6%	0.4%	4.1%
1996	10.17%	6.4%	1.5%	4.6%	2.2%	6.8%
1997	10.43%	1.0%	3.9%	0.0%	-1.0%	-0.9%
1998	10.72%	3.5%	2.1%	1.5%	1.1%	2.6%
Average		3.5%	2.6%	2.4%	0.5%	2.9%

	Cost of Capital	Industry TFP	Industry Input Price	TFP Differential	Input Price Diff	X Factor
1992	9.72%					
1993	9.72%	3.7%	5.3%	3.2%	-2.5%	0.7%
1994	9.72%	2.4%	1.5%	1.2%	1.7%	3.0%
1995	10.00%	4.0%	2.0%	3.7%	0.5%	4.2%
1996	10.28%	6.4%	2.4%	4.6%	1.3%	5.9%
1997	10.52%	1.0%	3.8%	0.0%	-0.9%	-0.9%
1998	10.59%	3.5%	1.5%	1.5%	1.6%	3.1%
Average		3.5%	2.8%	2.4%	0.3%	2.7%